Apprenticeship and Industry Training

Parts Technician

Apprenticeship Course Outline

2708 (2008)

Government of Alberta

Apprenticeship and Industry Training

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Parts Technician
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Apprenticeship

Apprenticeship is post-secondary education with a difference. Apprenticeship begins with finding an employer. Employers hire apprentices, pay their wages and provide on-the-job training and work experience. Approximately 80 per cent of an apprentice's time is spent on the job under the supervision of a certified journeyperson or qualified tradesperson. The other 20 per cent involves technical training provided at, or through, a post-secondary institution – usually a college or technical institute.

To become certified journeypersons, apprentices must learn theory and skills, and they must pass examinations. Requirements for certification—including the content and delivery of technical training—are developed and updated by the Alberta Apprenticeship and Industry Training Board on the recommendation of Parts Technician Provincial Apprenticeship Committee.

The graduate of the Parts Technician Apprenticeship Program is a certified journeyperson who will be able:

- have a comprehensive knowledge and understanding of the printed catalogue as well as the electronic systems and methods used in the identification, location, and supplying of parts and assemblies to repair shops and individuals
- know the characteristics and understand the actions and interactions of those skills and knowledge required to co-ordinate and determine the most favourable behaviour of parts and material inventories maintained by dealers, jobbers and other types of outlets
- relate to the work of other trades associated with the Parts Technician industry
- be knowledgeable in all aspects of the proper procedural methods for the safe handling and warehousing of all classes of parts and materials
- demonstrate the accurate, prompt identification and application of parts and assemblies required to maintain the serviceable condition of pleasure, commercial, industrial and agricultural vehicles and machines
- demonstrate the productive appl tion of skills and knowledge necessary to initiate and develop effective communication with the intelligent use of the telephone, facsimile, memos and have an adequate understanding of electronic and computerized equipment in the present day parts business
- demonstrate the ability to recognize and develop situations which are particularly relevant to customer satisfaction, human relations and product promotion
- cultivate an attitude or work ethic which will encourage the practice of good interpersonal skills and honesty
- maintain a standard of professionalism suitable to the position of responsibility held by the Parts Technician
- adapt and develop ability to move with confidence between sectors of the trade
- possess the ability to assess problems and provide corrective measure as they occur
- perform assigned tasks in accordance with quality and production standards required by industry

Apprenticeship and Industry Training System

Industry-Driven

Alberta's apprenticeship and industry training system is an industry-driven system that ensures a highly skilled, internationally competitive workforce in more than 50 designated trades and occupations. This workforce supports the economic progress of Alberta and its competitive role in the global market. Industry (employers and employees) establishes training and certification standards and provides direction to the system through an industry committee network and the Alberta apprenticeship and industry training board. The Alberta government provides the legislative framework and administrative support for the apprenticeship and industry training system.

Alberta Apprenticeship and Industry Training Board

The Alberta Apprenticeship and Industry Training Board provides a leadership role in developing Alberta's highly skilled and trained workforce. The board's primary responsibility is to establish the standards and requirements for training and certification in programs under the apprenticeship and industry training act. The board also provides advice to the minister of Advanced Education and Technology on the needs of Alberta's labour market for skilled and trained workers, and the designation of trades and occupations.

The thirteen-member board consists of a chair, eight members representing trades and four members representing other industries. There are equal numbers of employer and employee representatives.

Industry Committee Network

Alberta's Apprenticeship and Industry Training System relies on a network of industry committees, including local and provincial apprenticeship committees in the designated trades, and occupational committees in the designated occupations. The network also includes other committees such as provisional committees that are established before the designation of a new trade or occupation comes into effect. All trade committees are composed of equal numbers of employer and employee representatives. The industry committee network is the foundation of Alberta's apprenticeship and industry training system.

Local Apprenticeship Committees (LAC)

Wherever there is activity in a trade, the board can set up a local apprenticeship committee. The board appoints equal numbers of employee and employer representatives for terms of up to three years. The committee appoints a member as presiding officer. Local apprenticeship committees:

- monitor apprenticeship programs and the progress of apprentices in their trade, at the local level
- make recommendations to their trade's Provincial Apprenticeship Committee (PAC) about apprenticeship and certification in their trade
- promote apprenticeship programs and training and the pursuit of careers in their trade
- make recommendations to the board about the appointment of members to their trade's PAC
- help settle certain kinds of disagreements between apprentices and their employers
- carry out functions assigned by their trade's PAC or the board

Provincial Apprenticeship Committees (PAC)

The board establishes a provincial apprenticeship committee for each trade. It appoints an equal number of employer and employee representatives, and, on the PAC's recommendation, a presiding officer - each for a maximum of two terms of up to three years. Most PACs have nine members but can have as many as twenty-one. Provincial apprenticeship committees:

- Make recommendations to the board about:
    - Standards and requirements for training and certification in their trade
    - Courses and examinations in their trade
    - Apprenticeship and certification
    - Designation of trades and occupations
    - Regulations and orders under the apprenticeship and industry training act
- Monitor the activities of local apprenticeship committees in their trade
- Determine whether training of various kinds is equivalent to training provided in an apprenticeship program in their trade
- Promote apprenticeship programs and training and the pursuit of careers in their trade
- Consult with other committees under the apprenticeship and industry training act about apprenticeship programs, training and certification and facilitate cooperation between different trades and occupations
- Consult with organizations, associations and people who have an interest in their trade and with employers and employees in their trade
- May participate in resolving certain disagreements between employers and employees
- Carry out functions assigned by the board

Parts Technician PAC Members at the Time of Publication

Mr. M. Rockenbach	Lethbridge	Presiding Officer
Mr. J. Kutzner	Calgary	Employer
Mr. D. Nowak	Calgary	Employer
Mr. D. Lehmann	Fort McMurray	Employer
Ms. D. Villeneuve	Fort McMurray	Employer
Mr. W. Waugh	Lethbridge	Employer
Mr. C. Brunelle	Slave Lake	Employer
Mr. D. Lefebvre	Slave Lake	Employer
Mr. B. Campbell	Calgary	Employee
Ms. D. Cherniawsky	Calgary	Employee
Ms. E. Fulk	Edmonton	Employee
Ms. R. Jackson	Edmonton	Employee
Mr. C. Sergeew	Edmonton	Employee
Mr. D. Smith	Fort McMurray	Employee

Alberta Government

Alberta Advanced Education and Technology works with industry, employer and employee organizations and technical training providers to:

- Facilitate industry's development and maintenance of training and certification standards
- Provide registration and counselling services to apprentices and employers
- Coordinate technical training in collaboration with training providers
- Certify apprentices and others who meet industry standards

Technical Institutes and Colleges

The technical institutes and colleges are key participants in Alberta's apprenticeship and industry training system. They work with the board, industry committees and Alberta advanced education and technology to enhance access and responsiveness to industry needs through the delivery of the technical training component of apprenticeship programs. They develop lesson plans from the course outlines established by industry and provide technical training to apprentices.

Apprenticeship Safety

Safe working procedures and conditions, incident/injury prevention, and the preservation of health are of primary importance in apprenticeship programs in Alberta. These responsibilities are shared and require the joint efforts of government, employers, employees, apprentices and the public. Therefore, it is imperative that all parties are aware of circumstances that may lead to injury or harm.

Safe learning experiences and healthy environments can be created by controlling the variables and behaviours that may contribute to or cause an incident or injury. By practicing a safe and healthy attitude, everyone can enjoy the benefit of an incident and injury free environment.

Alberta Apprenticeship and Industry Training Board Safety Policy

The Alberta Apprenticeship and Industry Training Board fully supports safe learning and working environments and encourages the teaching of proper safety procedures both within trade specific training and in the workplace.

Trade specific safety training is an integral component of technical training, while ongoing or general non-trade specific safety training remains the responsibility of the employer and the employee as required under workplace health and safety legislation.

Workplace Responsibilities

The employer is responsible for:

- Training employees and apprentices in the safe use and operation of equipment
- Providing and maintaining safety equipment, protective devices and clothing
- Enforcing safe working procedures
- Providing safeguards for machinery, equipment and tools
- Observing all accident prevention regulations

The employee and apprentice are responsible for:

- Working in accordance with the safety regulations pertaining to the job environment
- Working in such a way as not to endanger themselves, fellow employees or apprentices

Workplace Health and Safety

A tradesperson is often exposed to more hazards than any other person in the work force and therefore should be familiar with and apply the occupational health and safety act, regulations and code when dealing with personal safety and the special safety rules that apply to all daily tasks.

Workplace Health and Safety (Alberta employment, immigration and industry) conducts periodic inspections of workplaces to ensure that safety regulations for industry are being observed.

Additional information is available at www.Worksafely.Org

Technical Training

Apprenticeship technical training is delivered by the technical institutes and many colleges in the public post-secondary system throughout Alberta. The colleges and institutes are committed to delivering the technical training component of Alberta apprenticeship programs in a safe, efficient and effective manner. All training providers place great emphasis on safe technical practices that complement safe workplace practices and help to develop a skilled, safe workforce.

The following institutions deliver Parts Technician Apprenticeship Technical Training:

SAIT Polytechnic
NAIT
Red Deer College
Lakeland College
Lethbridge College

Procedures for Recommending Revisions to the Course Outline

Advanced Education and Technology has prepared this course outline in partnership with the Parts Technician Provincial Apprenticeship Committee.

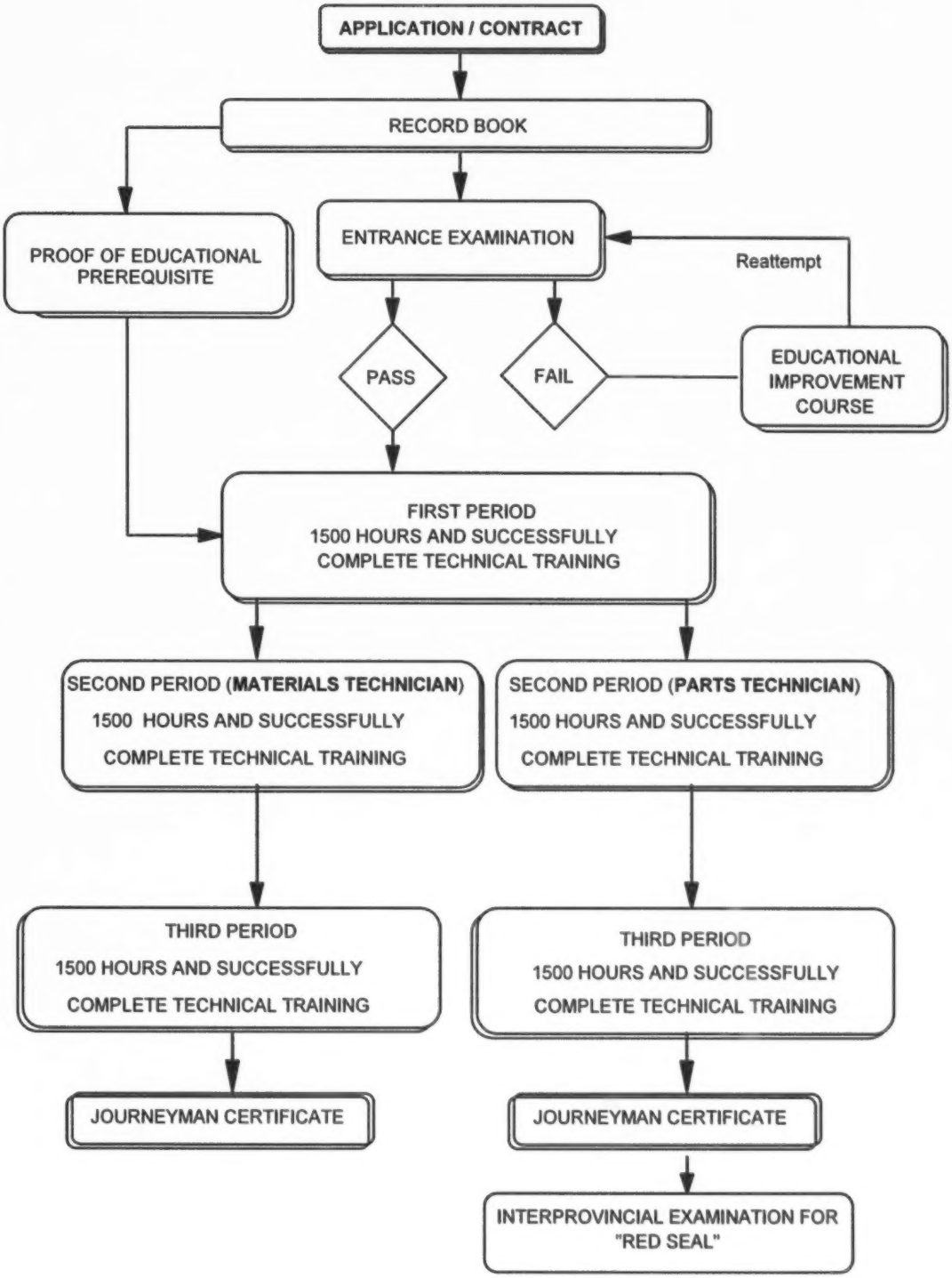
This course outline was approved on May 2, 2008 by the Alberta Apprenticeship and Industry Training Board on a recommendation from the provincial apprenticeship committee. The valuable input provided by representatives of industry and the institutions that provide the technical training is acknowledged.

Any concerned individual or group in the province of Alberta may make recommendations for change by writing to:

Parts Technician Provincial Apprenticeship Committee
C/O Industry Programs and Standards
Apprenticeship and Industry Training
Advanced Education and Technology
10th Floor, Commerce Place
10155 102 Street NW
Edmonton AB T5J 4L5

It is requested that recommendations for change refer to specific areas and state references used. Recommendations for change will be placed on the agenda for regular meetings of the Parts Technician provincial apprenticeship committee.

Apprenticeship Route toward Certification



Parts Technician Training Profile
FIRST PERIOD
(6 Weeks 30 Hours per Week – Total of 180 Hours)

SECTION ONE

SAFETY SKILLS AND PROCECURES
20 HOURS

A	B	C
Worksite Safety 5 Hours	Environmental Protection 5 Hours	Personal Safety 5 Hours

D
Hazard Assessment 5 Hours

SECTION TWO

MATERIAL HANDLING AND STORAGE
70 HOURS

A	B	C
Receiving: Receive Incoming Material 5 Hours	Receiving: Process & Track Incoming Material 5 Hours	Stocking and Staging 4 Hours
D	**E**	**F**
Material Storage 5 Hours	Picking and Issuing 5 Hours	Packing 5 Hours
G	**H**	**I**
Shipping 5 Hours	Product Returns 3 Hours	Stock Maintenance 5 Hours
J	**K**	**L**
Merchandising 8 Hours	Material Handling Equipment 5 Hours	Catalogues 15 Hours

SECTION THREE

MATERIAL IDENTIFICATION AND CALCULATIONS
60 HOURS

A	B	C
Measuring Calculations 5 Hours	Measuring Tools 6 Hours	Bearings 5 Hours
D	**E**	**F**
Seals 3 Hours	Electrical Fundamentals 5 Hours	Electrical Circuits 4 Hours
G	**H**	**I**
Hydraulic Fundamentals 4 Hours	Hydraulic System Components: Reservoir, Filters, Hoses and Coolers 5 Hours	Hydraulic System Components: Pumps and Valves 5 Hours
J	**K**	**L**
Hydraulics System Components: Cylinders, Motors and Accumulators 8 Hours	Standard Stock 5 Hours	Consumables 5 Hours

SECTION FOUR

COMMUNICATION
30 HOURS

A	B	C
Verbal Communication 5 Hours	Written Communication 5 Hours	Conflict Resolution 5 Hours
D	**E**	
Customer Service 5 Hours	Sales Techniques 10 Hours	

SECOND PERIOD—PARTS TECHNICIAN
(8 Weeks 30 Hours per Week – Total of 240 Hours)

SECTION ONE

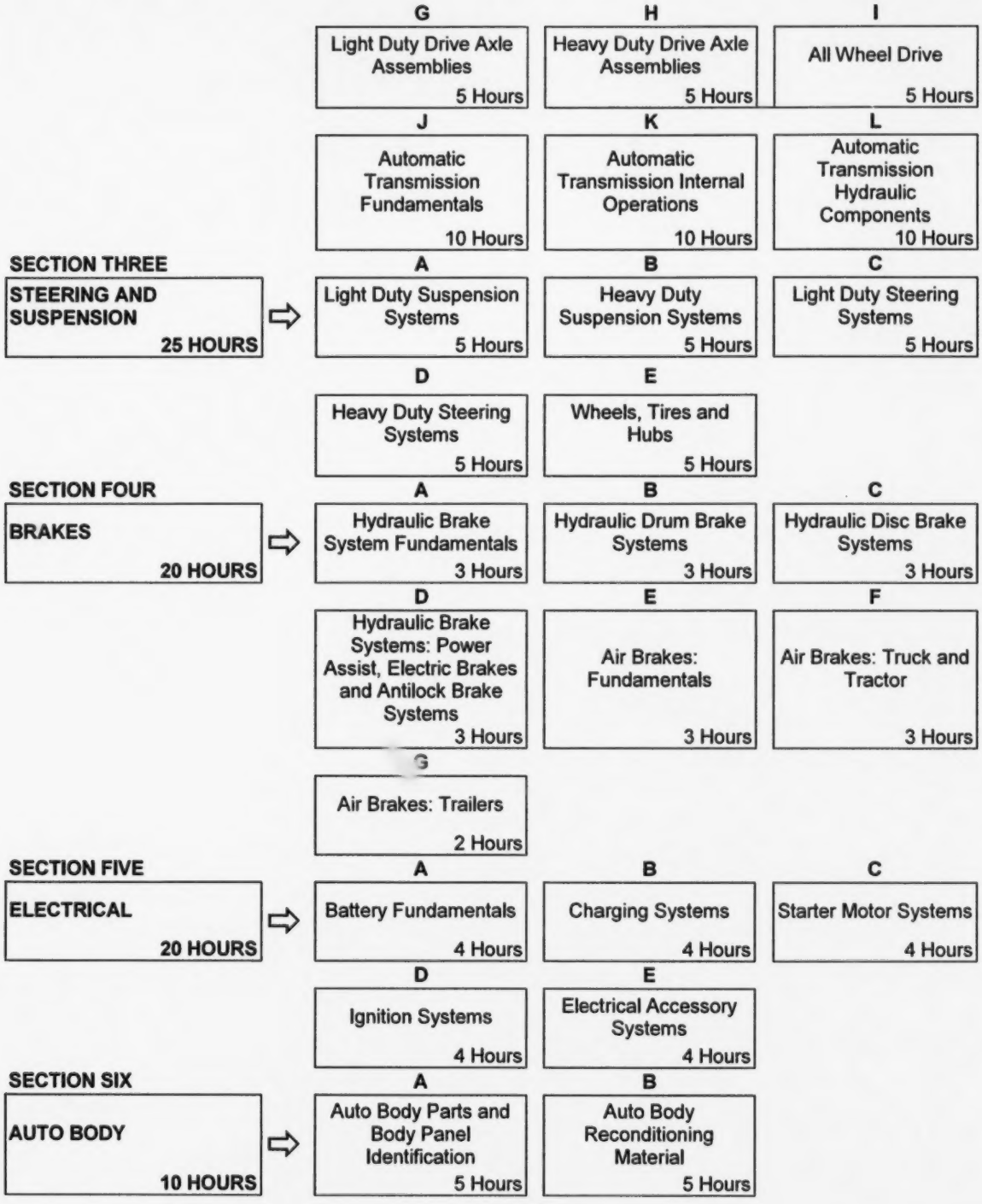
ENGINES AND RELATED SYSTEMS
71 HOURS

A	B	C
Engine Types, Applications and Designs 5 Hours	Engine Blocks and Liners 3 Hours	Pistons, Piston Rings and Connecting Rods 3 Hours
D	**E**	**F**
Crankshafts and Related Parts 3 Hours	Camshafts and Related Parts 3 Hours	Cylinder Heads and Related Parts 3 Hours
G	**H**	**I**
Engine Cooling Systems 5 Hours	Engine Lubrication Systems 3 Hours	Exhaust Systems 5 Hours
J	**K**	**L**
Air Induction Systems 5 Hours	Fuel Properties and Supply Systems 4 Hours	Gasoline Fuel Injection Systems 3 Hours
M	**N**	**O**
Diesel Fuel Injection Systems 3 Hours	Liquefied Petroleum Gas/Compressed Natural Gas Fuel Systems 3 Hours	Emission Control Systems 5 Hours
P	**Q**	**R**
Catalytic Converters and Exhaust Gas Recirculation Systems 5 Hours	Air Conditioning System Fundamentals 5 Hours	Air Conditioning System Operation 5 Hours

SECTION TWO

POWER TRAIN
72 HOURS

A	B	C
Chains, Sprockets, Belts and Pulleys 2 Hours	Gearing Principles 5 Hours	Clutches 5 Hours
D	**E**	**F**
Light Duty Manual Transmissions 5 Hours	Heavy Duty Manual Transmissions & PTOs 5 Hours	Drivelines 5 Hours


G
Light Duty Drive Axle Assemblies
5 Hours
H
Heavy Duty Drive Axle Assemblies
5 Hours
I
All Wheel Drive
5 Hours
J
Automatic Transmission Fundamentals
10 Hours
K
Automatic Transmission Internal Operations
10 Hours
L
Automatic Transmission Hydraulic Components
10 Hours
SECTION THREE
STEERING AND SUSPENSION
25 HOURS
A
Light Duty Suspension Systems
5 Hours
B
Heavy Duty Suspension Systems
5 Hours
C
Light Duty Steering Systems
5 Hours
D
Heavy Duty Steering Systems
5 Hours
E
Wheels, Tires and Hubs
5 Hours
SECTION FOUR
BRAKES
20 HOURS
A
Hydraulic Brake System Fundamentals
3 Hours
B
Hydraulic Drum Brake Systems
3 Hours
C
Hydraulic Disc Brake Systems
3 Hours
D
Hydraulic Brake Systems: Power Assist, Electric Brakes and Antilock Brake Systems
3 Hours
E
Air Brakes: Fundamentals
3 Hours
F
Air Brakes: Truck and Tractor
3 Hours
G
Air Brakes: Trailers
2 Hours
SECTION FIVE
ELECTRICAL
20 HOURS
A
Battery Fundamentals
4 Hours
B
Charging Systems
4 Hours
C
Starter Motor Systems
4 Hours
D
Ignition Systems
4 Hours
E
Electrical Accessory Systems
4 Hours
SECTION SIX
AUTO BODY
10 HOURS
A
Auto Body Parts and Body Panel Identification
5 Hours
B
Auto Body Reconditioning Material
5 Hours

SECTION SEVEN

AGRICULTURE AND MOBILE INDUSTRIAL EQUIPMENT
22 HOURS

A	B	C
Tillage, Seeding, Spraying and Spreading Equipment 6 Hours	Forage and Harvesting Equipment 4 Hours	Tractors 2 Hours
D	**E**	
Mobile Industrial Equipment Identification 6 Hours	Material Handling Equipment Identification 4 Hours	

SECOND PERIOD—MATERIALS TECHNICIAN
(6 Weeks 30 Hours per Week – Total of 180 Hours)

SECTION ONE

WAREHOUSE BUSINESS OPERATIONS
30 HOURS

A	B	C
Warehouse Activity 5 Hours	Measure Warehouse Activity 5 Hours	Audit Warehouse Activity 5 Hours
D	**E**	**F**
Warehouse Business Relationships 5 Hours	Warehouse Costs 5 Hours	Costs of Critical Inventory 5 Hours

SECTION TWO

MATERIALS HANDLING OPERATIONS AND EQUIPMENT
52 HOURS

A	B	C
Counterbalance Forklift Trucks 8 Hours	Narrow Aisle Forklifts 6 Hours	Cranes 5 Hours
D	**E**	**F**
Conveyors 5 Hours	Storage Equipment 5 Hours	Packaging and Packing 4 Hours
G	**H**	**I**
Containerization 4 Hours	Receiving Practices 5 Hours	Quality Assurance Related to Receiving 5 Hours
J		
Stocking and Storing Practices 5 Hours		

SECTION THREE

MATERIAL IDENTIFICATION AND TOOL CRIBS
63 HOURS

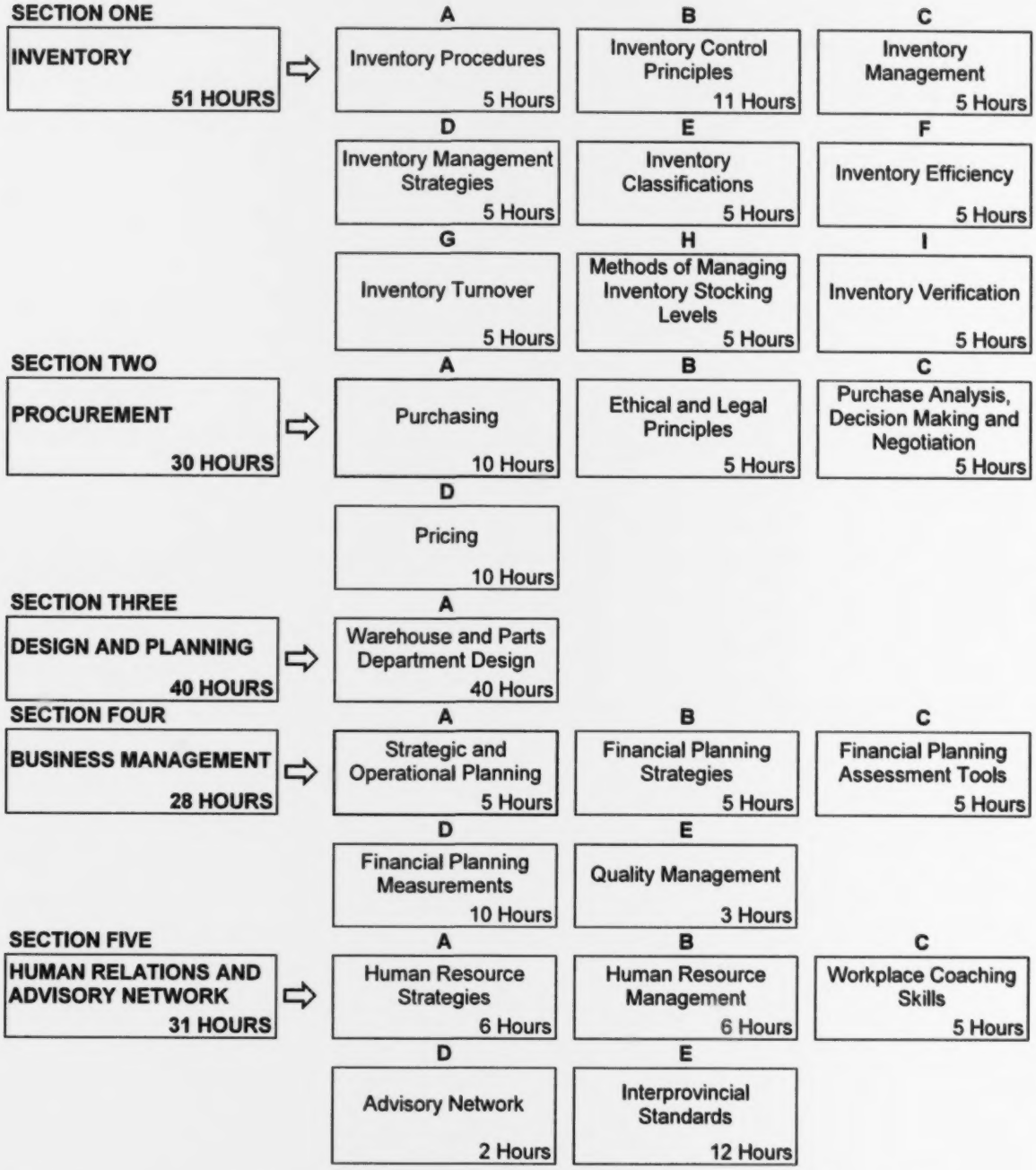
A	B	C
Material Identification Technology and Tagging: Basics 5 Hours	Material Identification Technology and Tagging: Electronic 5 Hours	Material Identification Technology and Tagging: Documentation 5 Hours
D	**E**	**F**
Track Equipment 5 Hours	Off Highway Equipment 10 Hours	Automotive Equipment 5 Hours
G	**H**	**I**
Agriculture Equipment 5 Hours	Oil Equipment 4 Hours	Gas Equipment 4 Hours
J	**K**	**L**
Forestry Equipment 5 Hours	Tool Crib Operations 5 Hours	Tool Crib Management 5 Hours

SECTION FOUR

TRANSPORTATION AND TRAFFIC
35 HOURS

A	B	C
Courier and Bus Transportation 7 Hours	Truck Transportation 8 Hours	Air, Rail and Marine Transportation 5 Hours
D	**E**	**F**
Traffic Management 5 Hours	Customs and Import 5 Hours	Customs and Export 5 Hours

THIRD PERIOD
(6 Weeks 30 Hours per Week – Total of 180 Hours)



NOTE: The hours stated are for guidance and should be adhered to as closely as possible. However, adjustments must be made for rate of apprentice learning, statutory holidays, registration and examinations for the training establishment and Apprenticeship and Industry Training.

FIRST PERIOD TECHNICAL TRAINING
PARTS TECHNICIAN TRADE
COURSE OUTLINE

UPON SUCCESSFUL COMPLETION OF THIS PROGRAM THE APPRENTICE SHOULD BE ABLE TO PERFORM THE FOLLOWING OUTCOMES AND OBJECTIVES.

SECTION ONE: ..... SAFETY SKILLS AND PROCEDURES ..... 20 HOURS

A. Worksite Safety ..... 5 Hours

Outcome: ***Identify the key areas of employee responsibility concerning safety.***

1. Identify the key areas of employee responsibility concerning safety.
2. Describe safe work habits.
3. Outline the application of OH&S regulations to worksite practices as they apply to employees, employers, suppliers and equipment.
4. Outline the application of legislative and other requirements as they apply to worksite safety.

B. Environmental Protection ..... 5 Hours

Outcome: ***Adhere to provincial environmental protection legislation.***

1. Describe the use of using environmentally sound practices and procedures at the worksite.
2. Outline the compliance requirements of current legislation and hazardous waste regulations.
3. Describe strategies to reduce waste generated at the worksite.
4. Explain spill prevention and spill containment strategies.
5. Explain release prevention and release containment strategies.

C. Personal Safety ..... 5 Hours

Outcome: ***Practice personal worksite safety.***

1. Select and maintain appropriate personal protective equipment for worksite applications.
2. Describe manual lifting operations using correct body mechanics.
3. Explain fire hazards, prevention and control procedures.

D. Hazard Assessment ..... 5 Hours

Outcome: ***Describe hazard assessment and control strategies.***

1. Explain the fundamentals of hazard assessment and control procedures.
2. Identify tools used for hazard assessment and control procedures.
3. Describe appropriate actions in case of emergency.
4. Describe security procedures for asset protection.

SECTION TWO: .....MATERIAL HANDLING AND STORAGE.....70 HOURS

A. Receiving: Receive Incoming Material .....5 Hours

Outcome: ***Receive incoming material.***

1. Outline the supply chain.
2. Describe the documentation related to receiving.
3. Describe the function of receiving
4. Describe the importance of paying attention to detail for receiving procedure.

B. Receiving: Process and Track Incoming Material .....5 Hours

Outcome: ***Process and track incoming material.***

1. Explain the procedure for processing shipments of materials received.
2. Describe quality assurance standards and requirements.
3. Describe GPS and RFID technology.

C. Stocking and Staging.....4 Hours

Outcome: ***Stock and stage incoming material.***

1. Describe the importance of proper stock identification and locating of materials.
2. Determine and apply stocking procedure.

D. Material Storage.....5 Hours

Outcome: ***Store materials.***

1. Describe considerations for the safe, secure and appropriate storage of materials.
2. Identify the benefits of appropriate storage methods.
3. Describe legislative and legal requirements relating to the storage of particular materials.
4. Describe common storage systems used on the worksite.

E. Picking and Issuing.....5 Hours

Outcome: ***Fill and issue orders.***

1. Explain the order cycle, including authorization and documentation.
2. Describe picking procedures.
3. Describe issuing procedures.
4. Identify reasons for product allocation.

F. Packing.....5 Hours

Outcome: ***Pack materials.***

1. Describe appropriate packing materials.
2. Describe packing methods.

G. Shipping ..... 5 Hours

Outcome: ***Ship materials.***

1. Identify types of shipments.
2. Determine the appropriate mode of shipping.
3. Identify proper types of documentation related to shipping.

H. Product Returns ..... 3 Hours

Outcome: ***Process product returns.***

1. Identify internal and external product return procedures and related documentation.
2. Outline policies and procedures for maintaining a core/exchange program.

I. Stock Maintenance ..... 5 Hours

Outcome: ***Maintain stock.***

1. Explain stock maintenance procedures.

J. Merchandising ..... 8 Hours

Outcome: ***Implement merchandising strategies.***

1. Define merchandising and its purpose.
2. Describe merchandising and its relationship to daily operations.
3. Describe cost-sharing merchandising plans and the advantages and disadvantages of participating.
4. Describe locations and methods for building displays.
5. Identify and apply a merchandising program.

K. Material Handling Equipment ..... 5 Hours

Outcome: ***Describe material handling equipment and related safety markings.***

1. Identify types of material handling equipment.
2. Identify types of packaging equipment.
3. Identify hazards related to material handling equipment.
4. Describe safety markings applied to material handling equipment.

L. Catalogues ..... 15 Hours

Outcome: ***Explain the purpose of material catalogues.***

1. Describe the function of catalogues.
2. Describe the structure of catalogues.
3. Identify various types of catalogues.
4. Describe the purpose of vehicle identification numbers and serial numbers.

SECTION THREE: ..... MATERIAL IDENTIFICATION AND CALCULATIONS ..... 60 HOURS

A. Measuring Calculations .....5 Hours

Outcome: ***Define and perform calculations related to common measurements.***

1. Perform calculations related to measurement using imperial and metric units.
2. Explain the term torque.
3. Convert numbers between decimals and fractions.
4. Calculate percentages.

B. Measuring Tools .....6 Hours

Outcome: ***Identify and use measuring tools.***

1. Perform linear measurements in imperial and SI units.
2. Demonstrate correct care and use of measuring tools.

C. Bearings .....5 Hours

Outcome: ***Identify and supply common bearings.***

1. State bearing functions and applications.
2. Describe the construction and application of friction bearings.
3. Describe the construction and application of anti friction bearings.
4. Describe storage methods and methods of supplying bearings.

D. Seals .....3 Hours

Outcome: ***Describe seals and their functions.***

1. State the function of seals.
2. Identify various types of seals and their applications.
3. Describe information required to supply replacement seals.

E. Electrical Fundamentals .....5 Hours

Outcome: ***Explain the fundamentals of electricity.***

1. Recognize common electrical symbols used in the trade.
2. Explain the physical qualities of insulators, conductors and semiconductors.
3. Explain magnetism and electromagnetism and their properties.
4. Explain the physical qualities and units of measure of electromotive force, current, resistance and power.
5. Describe the purpose of current control devices.

F. Electrical Circuits ..... 4 Hours

Outcome: ***Explain the fundamentals of electrical circuits.***

1. Identify the three basic circuit types and their basic properties.
2. Identify and explain open, shorted or grounded circuits.
3. Describe how to use a digital multimeter.
4. Explain the operation and applications for diodes, Zener diodes and transistors.

G. Hydraulic Fundamentals ..... 4 Hours

Outcome: ***Explain hydraulic principles and identify types of hydraulic fluid.***

1. Define hydraulic terminology.
2. Define Pascal's law and its application.
3. Using mathematical calculations, explain the hydraulic principles of pressure, force and area.
4. Explain the properties of hydraulic fluid and the criteria for its selection.

H. Hydraulic System Components: Reservoir, Filters, Hoses and Coolers ..... 5 Hours

Outcome: ***Explain the functions and principles of operation of hydraulic system components.***

1. State the functions of the hydraulic reservoir and its related components.
2. State the functions and principles of operation of filtration devices.
3. Explain the construction and applications of common types of hydraulic conductors.
4. State the function and applications of hydraulic heat exchangers.

I. Hydraulic System Components: Pumps and Valves ..... 5 Hours

Outcome: ***Explain the functions and principles of operation of hydraulic system components.***

1. Identify types and explain the operating principles of hydraulic pumps.
2. Explain the principles of operation and applications of hydraulic valves.

J. Hydraulic System Components: Cylinders, Motors and Accumulators ..... 8 Hours

Outcome: ***Explain the functions and principles of operation of hydraulic system components.***

1. Identify types and explain the operating principles of hydraulic cylinders.
2. Identify types and explain the operating principles of hydraulic motors.
3. Identify types and explain the operating principles of hydraulic accumulators.
4. Identify common replacement parts and related sales opportunities.

K. Standard Stock ..... 5 Hours

Outcome: ***Identify various standard stock.***

1. Identify various fastening devices, including alloys and grades.
2. Identify various lines and fittings.
3. Identify specialty items.

L. Consumables ..... **5 Hours**

Outcome: ***Identify various consumables.***

1. Identify various compounds and mixtures.
2. Identify various shop supplies.
3. Identify hazards related to repackaging and storing consumables.

SECTION FOUR..... COMMUNICATION ..... 30 HOURS

A. Verbal Communication ..... **5 Hours**

Outcome: ***Apply verbal communication skills.***

1. Identify and use verbal communication skills.
2. Identify and use effective listening skills.
3. Describe the relationship between verbal communication and interpersonal/customer relations.
4. Use verbal communication skills to deliver a presentation.

B. Written Communication ..... **5 Hours**

Outcome: ***Apply written communication skills.***

1. Identify when and why a specific form of written communication is used.
2. Organize and assemble written information.
3. Describe the relationship between written communication and interpersonal/customer relations.

C. Conflict Resolution..... **5 Hours**

Outcome: ***Discuss conflict resolution strategies.***

1. Define conflict.
2. Describe various conflict resolution strategies.
3. Describe the advantages and disadvantages of conflict.

D. Customer Service ..... **5 Hours**

Outcome: ***Identify goals of customer service.***

1. Describe different approaches used to provide customer service.
2. Discuss customer expectations.
3. Describe the impact of customer service.

E. Sales Techniques ..... **10 Hours**

Outcome: ***Describe sales techniques.***

1. Describe the attributes of a sales person.
2. Identify various sales methods.
3. Describe basic sales psychology.
4. Identify sales leads.
5. Describe techniques for closing sales.

SECOND PERIOD TECHNICAL TRAINING
PARTS TECHNICIAN TRADE
PARTS TECHNICIAN BRANCH
COURSE OUTLINE

UPON SUCCESSFUL COMPLETION OF THIS PROGRAM THE APPRENTICE SHOULD BE ABLE TO PERFORM THE FOLLOWING OUTCOMES AND OBJECTIVES.

SECTION ONE:.....ENGINES AND RELATED SYSTEMS..... 71 HOURS

A. Engine Types, Applications and Designs.....5 Hours

Outcome: ***Explain the operating principles and design features of two- and four-stroke internal combustion engines.***

1. Explain the stages of development of the internal combustion engine.
2. Explain common engine components, terms, definitions and functions.
3. Explain common methods of classifying engines.
4. Explain the principles of engine operation for both four-stroke and two-stroke cycle engines.
5. Compare and contrast the physical and operational differences between engines using different types of fuels.

B. Engine Blocks and Liners .....3 Hours

Outcome: ***Identify engine construction and materials.***

1. State the function of the engine cylinder block.
2. Identify cylinder block construction and design features.
3. Describe the construction and design features of removable cylinder liners.
4. Identify common replacement parts and related sales opportunities.

C. Pistons, Piston Rings and Connecting Rods.....3 Hours

Outcome: ***Identify types of pistons, piston rings and connecting rods and their purpose.***

1. Explain the function, construction and design features of pistons and piston pins.
2. Explain the function, construction and design features of piston rings.
3. Explain the function, construction and design features of connecting rods.
4. Identify common replacement parts and related sales opportunities.

D. Crankshafts and Related Parts .....3 Hours

Outcome: ***Describe the functions and design features of crankshafts and their related parts.***

1. Explain the function and design features of crankshafts.
2. Describe the function and design features of friction bearings specific to engines.
3. Explain the function, design features and principles of operation of balance shafts, auxiliary shafts, flywheels and harmonic balancers.
4. State the function of crankshaft related parts.
5. Identify common replacement parts and related sales opportunities.

E. Camshafts and Related Parts ..... 3 Hours

Outcome: ***Describe the functions and design features of camshafts and related parts.***

1. Explain the function and design features of camshafts, and related parts.
2. Explain the function and design features of camshaft followers.
3. Explain camshaft drive mechanisms and timing.
4. Identify common replacement parts and related sales opportunities.

F. Cylinder Heads and Related Parts ..... 3 Hours

Outcome: ***Identify types, designs and purpose of cylinder heads.***

1. Explain the function, construction and design features of cylinder heads.
2. State the purpose of and identify common combustion chamber designs used in gasoline and diesel engines.
3. Describe the construction and design features of engine valves and related components.
4. Describe the construction and design features of valve train components.
5. Identify cylinder head sealing and retention devices.
6. Identify common replacement parts and related sales opportunities.

G. Engine Cooling Systems ..... 5 Hours

Outcome: ***Describe the characteristics of engine coolant and cooling systems.***

1. Describe the physical principles involved in heat transfer.
2. Describe the purpose, construction and operation of air cooling systems and their related components.
3. Describe the purpose, construction and operation of liquid cooling systems and their related components.
4. Explain the operation of a thermostatic fan clutch, a thermostat and shutters.
5. Explain the operation of temperature indicators.

H. Engine Lubrication Systems ..... 3 Hours

Outcome: ***Describe the characteristics of engine lubrication and lubrication systems.***

1. Identify and describe the common functions and characteristics of lubricating oils.
2. Explain the principles of operation of common types of lubrication systems and their related components.
3. State the function, principles of operation and rating of filtration devices.
4. Describe correct procedures to follow when disposing of lubricants and filters.
5. Describe the use of oil analysis as a diagnostic tool.
6. Identify common replacement parts and related sales opportunities.

I. Exhaust Systems ..... 5 Hours

Outcome: ***Identify types and purpose of exhaust systems.***

1. Identify exhaust system components.
2. Explain the function and design features of exhaust manifolds.
3. Explain the function and design features of exhaust pipes, mufflers and related parts.
4. Identify common replacement parts and related sales opportunities.

J. Air Induction Systems ..... 5 Hours

Outcome: ***Identify types and function of air induction systems.***

1. Identify air induction systems and related components used on engines.
2. Identify types and function of pre-cleaners.
3. Identify types and functions of common air cleaners.
4. Describe the purpose and design features of intake manifolds.
5. Identify the parts, construction and operating principles of superchargers and turbochargers.
6. Identify common replacement parts and related sales opportunities.

K. Fuel Properties and Supply Systems ..... 4 Hours

Outcome: ***Describe the characteristics of fuels, the gasoline fuel supply system and identify common replacement parts.***

1. Describe the chemical properties of fuels.
2. Describe the characteristics of gasoline.
3. Describe safe and environmentally sensitive handling and storage practices for gasoline and diesel fuels.
4. Explain the purpose and operation of gasoline fuel tanks, lines and filters.
5. Identify the purpose and operation of fuel pumps and pressure regulators.

L. Gasoline Fuel Injection Systems ..... 3 Hours

Outcome: ***Describe the components, operation and purpose of gasoline fuel injection systems.***

1. Identify the purpose of components necessary to operate a computer-controlled fuel injection system.
2. Describe the design and function of a throttle body fuel injection system.
3. Describe the design and function of a multiport fuel injection system.
4. Identify common replacement parts and related sales opportunities.

M. Diesel Fuel Injection ..... 3 Hours

Outcome: ***Describe the diesel fuel supply system, types of diesel fuel injection systems and their purpose.***

1. Describe the characteristics of diesel fuel.
2. Explain the purpose and operation of diesel fuel tanks, pumps, lines and filters.
3. Explain the fundamental operation and design features of currently used diesel fuel injection systems and their related components.
4. Identify and describe the operation of injection pumps and injectors.
5. Describe diesel fuel injection system electronic controls.
6. Identify and describe accessory and protective diesel fuel systems.
7. Identify common replacement parts and related sales opportunities.

N. Liquefied Petroleum Gas/Compressed Natural Gas Fuel Systems ..... 3 Hours

Outcome: ***Describe alternate fuel delivery systems.***

1. Describe the characteristics of LPG (propane).
2. Explain the fundamental operation and function of the components of liquefied petroleum gas fuel systems.
3. Describe the characteristics of natural gas.
4. Explain the fundamental operation and function of the components of natural gas fuel system.
5. Identify common replacement parts and related sales opportunities.

O. Emission Control Systems..... 5 Hours

Outcome: ***Describe the operation and purpose of emission control systems.***

1. Explain the scientific principles involving the combustion process, vehicle emissions and their interrelationships.
2. Identify the regulated and non-regulated emissions resulting from combustion.
3. Explain the purpose and operation of evaporative emission systems.
4. Explain the purpose and operation of positive crankcase ventilation systems.
5. Explain the purpose, operation and types of air injection systems.
6. Identify common replacement parts and related sales opportunities regarding emission control systems.

P. Catalytic Converters and Exhaust Gas Recirculation Systems ..... 5 Hours

Outcome: ***Describe the major components of catalytic converters and exhaust gas recirculation systems.***

1. Explain the purpose, operation and types of catalytic converter systems.
2. Explain the purpose, operation and types of exhaust gas recirculation systems.
3. Explain the effect on exhaust emissions as a result of altering air-fuel ratio (AFR), ignition timing or engine design.
4. Identify common replacement parts and related sales opportunities.

Q. Air Conditioning System Fundamentals ..... 5 Hours

Outcome: ***Describe the operation and purpose of air conditioning systems.***

1. Describe environmental concerns related to fluorocarbon refrigerants.
2. Explain the principles and properties of heat.
3. Explain the properties of refrigerants and refrigerant oils.
4. Describe the safety principles to be followed when handling refrigerants and refrigerant oils.
5. Explain the function and operation of air conditioning system components.
6. Identify common replacement air conditioning parts and related sales opportunities.

R. Air Conditioning System Operation ..... 5 Hours

Outcome: ***Describe the contrast between factory and aftermarket air conditioning systems and describe the operation of air conditioning control and air distribution systems.***

1. Describe air conditioning hoses, fittings and service valves.
2. Describe the requirements of a retrofit conditioning system.
3. Identify and explain the operation of components and systems used for temperature control and air distribution.
4. Explain how air conditioning controls may be integrated with other vehicle electronic systems.
5. Compare a factory air conditioning system with an aftermarket system.
6. Identify common replacement parts and related sales opportunities.

SECTION TWO: ..... POWER TRAIN ..... 72 HOURS

A. Chains, Sprockets, Belts and Pulleys ..... 2 Hours

Outcome: ***Describe chains, sprockets, belts and pulleys.***

1. Identify and describe various types of chains.
2. Identify and describe various types of sprockets.
3. Identify and describe various types of belts.
4. Identify and describe various types of pulleys.
5. Calculate drive ratios.

B. Gearing Principles ..... 5 Hours

Outcome: ***Describe types of gears and calculate gear ratios.***

1. Explain gear relationships with regard to ratios and input/output direction.
2. Identify common gear types and applications.

C. Clutches ..... 5 Hours

Outcome: ***Describe the operation and purpose of clutches.***

1. Explain the principles of operation of a clutch.
2. Explain the construction, design features and function of a clutch assembly.
3. Describe the clutch actuating methods.

D. Light Duty Manual Transmissions.....5 Hours

Outcome: ***Describe the purpose and operating principles of light duty manual transmissions and transaxles.***

1. Identify types and designs of light duty manual transmissions and transaxles, of various speeds.
2. Identify the major parts of a light duty manual transmission.
3. Identify designs and functions of synchronizers and shift mechanisms.
4. Describe principles of operation of a light duty manual transmission.
5. Describe principles of operation of a transaxle and follow the path of power.
6. Explain how light duty manual transmissions and transaxle internal components are lubricated and choose the correct type of lubricant.
7. Identify common replacement parts and related sales opportunities.

E. Heavy Duty Manual Transmissions & PTOs.....5 Hours

Outcome: ***Describe the purpose and operating principles of heavy duty transmissions and PTOs.***

1. Identify types and designs of heavy duty manual transmissions.
2. Identify and describe the principles of operation of the major parts of a heavy duty manual transmission.
3. Explain how heavy duty manual transmissions are lubricated.
4. Identify types of PTOs and their operation.
5. Identify common replacement parts and related sales opportunities.

F. Drivelines.....5 Hours

Outcome: ***Describe the operation and purpose of drivelines.***

1. Explain the construction, design features, operation and function of common rear-wheel-drive driveline components.
2. Explain the construction, design features, operation and function of common front-wheel-drive driveline components
3. Identify common replacement parts and related sales opportunities.

G. Light Duty Drive Axle Assemblies.....5 Hours

Outcome: ***Describe the operation and purpose of light duty drive axle assemblies.***

1. Describe the function and principles of operation of light duty drive axle assemblies.
2. Describe the operation and identify the parts of a standard differential.
3. Describe the operation and identify the parts of traction-enhancing differentials.
4. Identify types of lubrication for differentials.
5. Identify common replacement parts and related sales opportunities.

H. Heavy Duty Drive Axle Assemblies ..... 5 Hours

Outcome: ***Describe the purpose and operating principles of heavy duty drive axle assemblies.***

1. Identify types and designs of heavy duty drive axle assemblies.
2. Identify and describe the principles of operation of the major parts of a heavy duty drive axle assembly.
3. Identify common replacement parts and related sales opportunities.
4. Describe the operation and identify the parts of a power divider/ two speed axle assembly.

I. All Wheel Drive ..... 5 Hours

Outcome: ***Describe the operation and purpose of all wheel drive, four wheel drive and transfer cases.***

1. Explain the purpose and operation of a manual transfer case.
2. Explain the basic shifting operations of a transfer case with electronic controls.

J. Automatic Transmission Fundamentals ..... 10 Hours

Outcome: ***Explain the principles of operation of an automatic transmission and describe the types and characteristics of transmission fluids.***

1. Explain the principles of operation of an automatic transmission.
2. Explain the purpose, types and characteristics of automatic transmission fluids.
3. Explain the purpose, parts and operation of a non-lockup torque converter.
4. Explain the purpose, parts and operation of a lockup torque converter.
5. Describe the function, parts and operation of automatic transmission oil pumps.
6. Identify common replacement parts and related sales opportunities.

K. Automatic Transmission Internal Operations ..... 10 Hours

Outcome: ***Describe the operation and purpose of internal automatic transmission components.***

1. State the purpose, function and principles of operation of a planetary gear set.
2. Explain the purpose, parts and operation of clutch assemblies, pistons and seals.
3. Explain the purpose, parts and operation of transmission bands and servo assemblies.
4. Identify common replacement automatic transmission parts and related sales opportunities.

L. Automatic Transmission Hydraulic Components ..... 10 Hours

Outcome: ***Describe the operation and purpose of automatic transmission hydraulic components.***

1. Explain the operation of simple types of hydraulic valves used in automatic transmissions.
2. Explain the purpose and operation of a manual valve.
3. Describe the purpose and operation of pressure-regulating valves used in automatic transmissions.
4. Describe the purpose and operation of common types of throttle and modulator valves.
5. Describe the function of governors.

6. Explain the purpose and operation of a shift valve.
7. Explain how electronics are used to control an automatic transmission
8. Identify common replacement parts and related sales opportunities

SECTION THREE: ..... STEERING AND SUSPENSION..... 25 HOURS

A. Light Duty Suspension Systems .....5 Hours

Outcome: ***Describe the operation and purpose of light duty suspension systems.***

1. Explain the principles of operation of light duty suspension systems.
2. Describe types of springs used in light duty suspension systems.
3. Describe the purpose and operation of shock absorbers.
4. Describe the purpose and operation of suspension components.
5. Describe suspension designs.
6. Identify common replacement parts and related sales opportunities.

B. Heavy Duty Suspension Systems .....5 Hours

Outcome: ***Describe the operation and purpose of heavy duty suspension systems.***

1. Identify and explain the operation of various heavy duty suspension systems.
2. Describe heavy duty suspension designs.
3. Identify common replacement parts and related sales opportunities.

C. Light Duty Steering Systems .....5 Hours

Outcome: ***Describe the operation of light duty steering systems and identify replacement parts.***

1. Identify steering linkage types and explain their operation.
2. Explain the function, design features and lubrication requirements of common light duty manual steering gears.
3. Explain the function and design features of power steering gears
4. Identify power steering pump types and explain their operation
5. Explain the function, design features and operation of steering column safety features.
6. Identify common replacement parts and related sales opportunities.

D. Heavy Duty Steering Systems .....5 Hours

Outcome: ***Describe the operation and purpose of heavy duty steering systems.***

1. Identify and explain the operation of various heavy duty industrial equipment steering systems.
2. Identify and explain the operation of various heavy duty truck steering systems.
3. Identify common replacement parts and related sales opportunities.

E. Wheels, Tires and Hubs ..... 5 Hours

Outcome: ***Describe the design features and purpose of wheels, tires and hubs.***

1. Explain the construction, sizing, rating and design features of automotive and light truck tires and wheels.
2. Explain the construction, sizing, rating and design features of heavy duty truck tires and wheels.
3. Explain the purpose of static and dynamic balancing.
4. Describe causes of tire wear and common repair methods.
5. Identify components of a wheel hub and spindle assembly.
6. Identify common replacement parts and related sales opportunities.

SECTION FOUR: ..... BRAKES ..... 20 HOURS

A. Hydraulic Brake System Fundamentals ..... 3 Hours

Outcome: ***Describe the fundamentals of brake systems and identify types of brake fluids.***

1. Explain the principles that apply to brake systems.
2. State Pascal's law and its implications for brake systems.
3. Choose the correct brake fluid for a given application based on purpose, function and characteristics of brake fluids.
4. Explain the principles of operation, construction and design features of common brake components.
5. Describe the operation of hydraulic components when used as a system.
6. Identify common replacement parts and related sales opportunities.

B. Hydraulic Drum Brake Systems ..... 3 Hours

Outcome: ***Describe the operation and purpose of hydraulic drum brake systems.***

1. Explain the design features and operation of drum brake system components.
2. Explain the operation of drum-type parking brake systems.
3. Identify common replacement parts and related sales opportunities.

C. Hydraulic Disc Brake Systems ..... 3 Hours

Outcome: ***Describe the operation and purpose of hydraulic disc brake systems.***

1. Explain the operation and design features of disc brake systems.
2. Explain the operation of disc-type parking brake systems.
3. Identify common replacement parts and related sales opportunities.

D. Hydraulic Brake Systems: Power Assist, Electric Brakes and Antilock Brake Systems .....3 Hours

Outcome: ***Describe the operation, purpose and identify supply replacement parts of assisted brake systems, electric brake systems and antilock brake systems.***

1. Describe the operation of vacuum-operated power brake units.
2. Describe the operation of hydraulically operated power brake units.
3. Describe the operation of the electro-hydraulic power brake units.
4. Explain the principles of operation of air-over-hydraulic brake booster systems.
5. Explain the principle of operation for electric braking systems.
6. Explain the operation of an antilock brake system (ABS) and identify basic components.
7. Identify common replacement parts and related sales opportunities.

E. Air Brakes: Fundamentals.....3 Hours

Outcome: ***Explain the fundamental principles of operation of an air brake system.***

1. Explain the principles of operation of an air brake system.
2. Describe a simple air brake system consisting of a compressor, reservoir, foot valve, steering axle and single drive axle brake chambers and connecting lines.
3. Explain the operating principles of a typical cam-operated foundation brake.
4. Identify common replacement air brake system parts and related sales opportunities.

F. Air Brakes: Truck and Tractor .....3 Hours

Outcome: ***Explain the principles of operation of truck/tractor air brake systems.***

1. Explain the functions and principles of operation of common air brake supply circuit components.
2. Explain the functions and principles of operation of common primary service brake circuit components.
3. Explain the functions and principles of operation of common secondary service brake circuit components.
4. Explain the functions and principles of operation of common parking/emergency brake circuit components.
5. Identify common replacement parts and related sales opportunities regarding air brake systems.

G. Air Brakes: Trailers .....2 Hours

Outcome: ***Explain the principles of operation of trailer air brake systems and describe the basic operation of an antilock air brake system.***

1. Explain the functions and principles of operation of common trailer controls and circuit components.
2. Explain the functions and principles of operation of common components used on trailer brake systems.
3. Explain the operation of an antilock air brake system.
4. Identify common replacement parts and related sales opportunities regarding air brake systems.

SECTION FIVE: ..... ELECTRICAL ..... 20 HOURS

A. Battery Fundamentals ..... 4 Hours

Outcome: ***Describe the operation and purpose of the battery and handling procedures.***

1. Define and list types of common batteries, their advantages and disadvantages.
2. Identify hazards encountered with lead-acid batteries.
3. Explain battery construction, sizing and capacity.
4. List safety precautions and procedures for boosting batteries.
5. List the safety precautions and procedures for charging batteries.
6. Describe handling, storage and disposal of batteries and electrolyte.

B. Charging Systems ..... 4 Hours

Outcome: ***Describe the operation and purpose of charging systems.***

1. Explain the purpose of the charging system.
2. Identify charging system components.
3. Describe the operational characteristics of an alternator.
4. Identify various designs of alternators.
5. Identify common regulator types and designs.
6. Explain the operation of charging system indicator circuits.
7. Identify common replacement parts of a charging system.

C. Starter Motor Systems ..... 4 Hours

Outcome: ***Describe the operation and purpose of cranking systems.***

1. Explain the purpose, construction and operation of electrical starter motors and their related components.
2. Explain the purpose and operation of starter lockout devices.
3. State the function of non-electric cranking systems.
4. Identify common replacement parts and related sales opportunities.

D. Ignition Systems ..... 4 Hours

Outcome: ***Describe the operation and purpose of ignition systems.***

1. Explain the purpose, construction and operation of an ignition system and its related components.
2. Identify and explain the operation of an electronic ignition system.
3. Identify components and explain the basic operation of a distributorless ignition system.
4. Explain the purpose, construction and operation of magneto ignition systems.
5. Identify common replacement parts and related sales opportunities.

E. Electrical Accessory Systems ..... 4 Hours

Outcome: ***Identify replacement parts related to electrical accessories.***

1. Explain the basic operation and components of common electrical accessory circuits.
2. Explain the components and basic operation of lighting systems.
3. Identify common replacement parts and related sales opportunities.

SECTION SIX: ..... AUTO BODY ..... 10 HOURS

A. Auto Body Parts and Body Panel Identification ..... 5 Hours

Outcome: ***Identify auto body parts, and body panels.***

1. Discuss identification information required for auto body parts and body panels.
2. Identify and describe auto body parts.
3. Identify and describe body panels.
4. Identify and describe automotive glass.
5. Identify and describe restraint systems.

B. Auto Body Reconditioning Material ..... 5 Hours

Outcome: ***Identify auto body reconditioning materials.***

1. Identify and describe abrasives.
2. Identify and describe bonding and adhesive products.
3. Identify and describe various types of paints and finishes.

SECTION SEVEN: ..... AGRICULTURAL AND MOBILE INDUSTRIAL EQUIPMENT ..... 22 HOURS

A. Tillage, Seeding, Spraying and Spreading Equipment ..... 6 Hours

Outcome: ***Describe tillage, seeding, spraying and spreading equipment.***

1. Identify and describe primary tillage equipment.
2. Identify common replacement components for primary tillage equipment.
3. Identify and describe secondary tillage equipment.
4. Identify common replacement components for secondary tillage equipment.
5. Identify and describe seeding equipment.
6. Identify common replacement parts for each type of seeding equipment.
7. Identify and describe spreaders and sprayers.
8. Identify common replacement parts for spreaders and sprayers.

B. Forage and Harvesting Equipment ..... 4 Hours

Outcome: ***Describe forage and harvesting equipment.***

1. Identify and describe forage equipment.
2. Identify common replacement parts for each type of forage equipment.
3. Identify and describe harvesting equipment.
4. Identify common replacement parts for each type of harvesting equipment.

C. Tractors ..... 2 Hours

Outcome: ***Describe tractors.***

1. Identify and describe various types of tractors.
2. Identify major components of tractors.
3. Identify common replacement parts used on tractors.
4. Explain the importance of safety devices.

D. Mobile Industrial Equipment Identification ..... 6 Hours

Outcome: ***Identify mobile industrial equipment.***

1. Identify and describe various types of mobile industrial equipment.
2. Identify common replacement parts for mobile industrial equipment.

E. Material Handling Equipment Identification ..... 4 Hours

Outcome: ***Identify material handling equipment.***

1. Identify and describe various types of material handling equipment.
2. Identify common replacement parts for material handling equipment.

SECOND PERIOD TECHNICAL TRAINING
PARTS TECHNICIAN TRADE
MATERIALS TECHNICIAN BRANCH
COURSE OUTLINE

UPON SUCCESSFUL COMPLETION OF THIS PROGRAM THE APPRENTICE SHOULD BE ABLE TO PERFORM THE FOLLOWING OUTCOMES AND OBJECTIVES.

SECTION ONE:..... WAREHOUSE BUSINESS OPERATIONS ..... 30 HOURS

A. Warehouse Activity ..... 5 Hours

Outcome: ***Describe warehouse activity.***

1. Describe various warehouse activity procedures.
2. Describe the importance of cross docking procedures.

B. Measure Warehouse Activity ..... 5 Hours

Outcome: ***Measure warehouse activity.***

1. Identify activity measurements.
2. Describe the use of product activity measurements.
3. Describe the use of labour activity measurements.

C. Audit Warehouse Activity ..... 5 Hours

Outcome: ***Analyze warehouse costs.***

1. Describe the basis of auditing.
2. Describe the use of internal auditing tools.
3. Describe various external audits.

D. Warehouse Business Relationships ..... 5 Hours

Outcome: ***Manage internal and external warehouse business relations.***

1. Describe how warehousing activities relate to production.
2. Describe how warehousing activities relate to marketing and sales.
3. Describe how warehousing activities relate to purchasing.
4. Describe how warehousing activities relate to product transportation.

E. Warehouse Costs ..... 5 Hours

Outcome: ***Analyze warehouse costs.***

1. Define capital and its cost.
2. Identify the financial implications of a warehouse.

F. Costs of Critical Inventory ..... 5 Hours

Outcome: ***Evaluate the cost of holding critical inventory.***

1. Define critical inventory.
2. Evaluate the cost of holding critical inventory.

SECTION TWO: .....MATERIALS HANDLING OPERATIONS AND EQUIPMENT..... 52 HOURS

A. Counterbalance Forklift Trucks ..... 8 Hours

Outcome: ***Describe counterbalance forklift truck operation.***

1. Identify types of counterbalance forklift trucks and related applications.
2. Describe forklift features.
3. Describe safe operation and use of forklift trucks.

B. Narrow Aisle Forklifts ..... 6 Hours

Outcome: ***Describe narrow aisle forklift operation.***

1. Identify types of narrow aisle forklifts and related applications.
2. Describe narrow aisle forklift features.
3. Describe safe operation and use of narrow aisle forklifts.

C. Cranes ..... 5 Hours

Outcome: ***Describe crane operation.***

1. Identify types of cranes and related applications.
2. Describe cranes features.
3. Describe safe operation and use of cranes.

D. Conveyors ..... 5 Hours

Outcome: ***Describe conveyor application.***

1. Identify types of conveyors and related applications.
2. Describe conveyors features.
3. Describe safe operation and use of conveyors.

E. Storage Equipment ..... 5 Hours

Outcome: ***Describe storage equipment and related applications.***

1. Identify various types of storage equipment.
2. Describe features of storage equipment.
3. Describe usage and safe operation of storage equipment.

F. Packaging and Packing ..... 4 Hours

Outcome: ***Select and use packaging, packing.***

1. Identify various types of packaging materials.
2. Describe the function and design of packaging materials.
3. Describe safe use of packaging materials.

G. Containerization ..... 4 Hours

Outcome: ***Select and use containers.***

1. Identify various types of containers.
2. Describe the function and design of containers.
3. Describe safe use of containers.

H. Receiving Practices ..... 5 Hours

Outcome: ***Assess the impact of receiving practices.***

1. Describe the importance of receiving within a warehouse operation.
2. Describe how receiving impacts inventory control.
3. Explain and calculate early payment discounts.
4. Describe loss, overage and damage claims.

I. Quality Assurance Related To Receiving ..... 5 Hours

Outcome: ***Describe quality assurance related to receiving.***

1. Identify material related to quality assurance.
2. Outline quality assurance documentation, legislative and other requirements.

J. Stocking and Storing Practices ..... 5 Hours

Outcome: ***Assess the impact of stocking and storing practices.***

1. Describe the importance of stocking and storing within a warehouse operation.
2. Describe how stocking and storing impact inventory control.
3. Describe financial impact of stocking techniques.
4. Explain special storage practices related to inventory integrity.

SECTION THREE: ..... MATERIAL IDENTIFICATION AND TOOL CRIBS ..... 63 HOURS

A. Material Identification Technology And Tagging: Basics ..... 5 Hours

Outcome: ***Describe material identification.***

1. Explain the importance and value of proper identification of materials.
2. Describe the physical methods of material identification.

B. Material Identification Technology and Tagging: Electronic ..... 5 Hours

Outcome: ***Describe material identification.***

1. Describe electronic methods of material identification.

C. Material Identification Technology and Tagging: Documentation ..... 5 Hours

Outcome: ***Describe material identification.***

1. Describe records and documentation related to materials identification and tagging.

D. Track Equipment ..... 5 Hours

Outcome: ***Describe track equipment.***

1. Identify the major components of track equipment.
2. Identify common replacement parts for track equipment.

E. Off Highway Equipment ..... 10 Hours

Outcome: ***Describe off highway equipment.***

1. Identify the major components of off highway equipment.
2. Identify common replacement parts for off highway equipment.

F. Automotive Equipment ..... 5 Hours

Outcome: ***Describe automotive equipment.***

1. Identify the major components of automotive equipment.
2. Identify common replacement parts for automotive equipment.

G. Agriculture Equipment ..... 5 Hours

Outcome: ***Describe agriculture equipment.***

1. Identify the major components of agriculture equipment.
2. Identify common replacement parts for agriculture equipment.

H. Oil Equipment ..... 4 Hours

Outcome: ***Describe materials and equipment used in the oil industry.***

1. Identify materials used in the oil industry.
2. Identify equipment used in the oil industry.
3. Identify valves used in the oil industry.
4. Identify piping used in the oil industry.

I. Gas Equipment ..... 4 Hours

Outcome: ***Describe materials and equipment used in the gas industry.***

1. Identify materials used in the gas industry.
2. Identify valves used in the gas industry.
3. Identify equipment used in the gas industry.
4. Identify piping used in the gas industry.

J. Forestry Equipment ..... 5 Hours

Outcome: ***Describe materials and equipment used in the forestry industry.***

1. Identify materials used in the forestry industry.
2. Identify equipment used in the forestry industry.

K. Tool Cribs ..... 5 Hours

Outcome: Describe the purpose and operation of a tool crib.

1. Describe the purpose of a tool crib.
2. Describe the operation of a tool crib, including tracking and repair of tools.
3. Describe regulations and legislation associated with goods requiring recertification.

L. Tool Crib Management ..... 5 Hours

Outcome: Describe the management of a tool crib.

1. Describe the management of a tool crib.

SECTION FOUR: ..... TRANSPORTATION AND TRAFFIC ..... 35 HOURS

A. Courier and Bus Transportation ..... 7 Hours

Outcome: Describe transportation methods.

1. Identify various methods of transportation.
2. Identify internal and external factors effecting transportation.
3. Describe the impact of various modes of transportation.
4. Describe and calculate the costs involved with various forms of transportation.

B. Truck Transportation ..... 8 Hours

Outcome: Describe transportation methods.

1. Identify various methods of transportation.
2. Identify internal and external factors effecting transportation.
3. Describe the impact of various modes of transportation.
4. Describe and calculate the costs involved with various forms of transportation.

C. Air, Rail and Marine Transportation ..... 5 Hours

Outcome: Describe transportation methods.

1. Identify various methods of transportation.
2. Identify internal and external factors effecting transportation.
3. Describe the impact of various modes of transportation.
4. Describe and calculate the costs involved with various forms of transportation.

D. Traffic Management ..... 5 Hours

Outcome: Describe traffic management.

1. Describe the function of expediting shipments.
2. Outline claims prevention strategies.
3. Identify scheduling strategies.
4. Identify documentation and legislation associated with traffic management.

E. Customs and Import ..... 5 Hours

Outcome: ***Explain the import/export process.***

1. Identify customs import regulations.
2. Identify customs import documentation.

F. Customs and Export ..... 5 Hours

Outcome: ***Explain the export process.***

1. Identify customs export regulations.
2. Identify customs export documentation.

THIRD PERIOD TECHNICAL TRAINING
PARTS TECHNICIAN TRADE
COURSE OUTLINE

UPON SUCCESSFUL COMPLETION OF THIS PROGRAM THE APPRENTICE SHOULD BE ABLE TO PERFORM THE FOLLOWING OUTCOMES AND OBJECTIVES.

SECTION ONE:.....INVENTORY ..... 51 HOURS

A. Inventory Procedures ..... 5 Hours

Outcome: ***Outline inventory maintenance procedures.***

1. Identify types of inventory.
2. Describe the functions of inventory.
3. Identify inventory control systems.

B. Inventory Control Principles ..... 11 Hours

Outcome: ***Describe Inventory control principles.***

1. Describe the costs of carrying an inventory.
2. Describe the life cycle of product.
3. Describe principles of inventory control.

C. Inventory Management ..... 5 Hours

Outcome: ***Manage inventory.***

1. Describe inventory related terminology.
2. Identify various costs associated with inventory.
3. Identify and measure the impact of inventory.
4. Discuss various methods of forecasting demand.

D. Inventory Management Strategies ..... 5 Hours

Outcome: ***Identify various inventory strategies.***

1. Describe various inventory strategies.
2. Identify various factors effecting inventory strategies.
3. Identify advantages and disadvantages of various inventory strategies.
4. Calculate the costs of various inventory strategies.

E. Inventory Classifications ..... 5 Hours

Outcome: ***Explain Inventory classifications***

1. Describe various inventory classifications.
2. Describe inventory obsolescence.
3. Explain the costs associated with obsolete inventory.

F. Inventory Efficiency ..... 5 Hours

Outcome: ***Describe and use inventory efficiency measurements.***

1. Calculate level of service percentage.
2. Calculate projected inventory levels.
3. Calculate working inventory value percentage.
4. Calculate the cost of pilferage.

G. Inventory Turnover ..... 5 Hours

Outcome: ***Evaluate inventory turnover rates.***

1. Describe various turnover rates.
2. Calculate inventory turnover rates.

H. Methods of Managing Inventory Stocking Levels ..... 5 Hours

Outcome: ***Describe methods used to determine inventory stocking levels and replenishment.***

1. Describe safety stock inventory management methods.
2. Describe various stocking levels methods and determine re-order point.
3. Describe economic order quantity (EOQ).
4. Describe fixed quantity method of inventory management.
5. Describe Just-In-Time inventory management.

I. Inventory Verification ..... 5 Hours

Outcome: ***Describe methods of inventory verification.***

1. Describe the importance of inventory verification.
2. Explain various methods of conducting inventory verification.
3. Describe organizational procedures for inventory verification.

SECTION TWO: ..... PROCUREMENT ..... 30 HOURS

A. Purchasing ..... 10 Hours

Outcome: ***Explain the purchasing process.***

1. Identify various types of orders, and describe impact.
2. Identify various types of purchasing, and describe impact.
3. Identify various types of purchasing documentation.
4. Identify various types of purchasing systems.

B. Ethical And Legal Principles ..... 5 Hours

Outcome: ***Describe ethical and legal principles of purchasing.***

1. Describe the legal and ethical guidelines that govern purchasing.
2. Identify the elements of a legal contract.
3. Discuss the obligations that both the buyer and the vendor have when entering into a transaction.

C. Purchase Analysis, Decision Making And Negotiation ..... 5 Hours

Outcome: ***Explain purchase analysis, decision making and negotiation techniques.***

1. Describe the operations included in purchasing material or services.
2. Describe various purchasing cost analyses.
3. Describe lead-time and how it effects purchasing.
4. Describe various negotiation techniques.

D. Pricing ..... 10 Hours

Outcome: ***Describe pricing methods.***

1. Interpret various price structures and price lists.
2. Discuss methods of charging out consumables.
3. Describe the purpose of mark-ups and discounts.
4. Calculate mark-ups on cost price (cost, consecutive and constant multipliers).
5. Calculate mark-ups on selling price.
6. Calculate mark-downs (discounts, consecutive and constant multipliers).
7. Calculate gross profit and gross profit margin.

SECTION THREE: ..... DESIGN AND PLANNING ..... 40 HOURS

A. Warehouse and Parts Department Design ..... 40 Hours

Outcome: ***Design a warehouse or parts department.***

1. Outline the application of legislative and other requirements as they apply to space design.
2. Discuss various market needs and how they impact design.
3. Assess traffic flow and space requirements.
4. Identify various storage systems.
5. Discuss infrastructure for design.

SECTION FOUR: ..... BUSINESS MANAGEMENT ..... 28 HOURS

A. Strategic and Operational Planning ..... 5 Hours

Outcome: ***Describe strategic and operational planning processes.***

1. Discuss importance of strategic planning.
2. Discuss importance of operational planning.
3. Describe rationale for setting goals and performance measures.

B. Financial Planning Strategies ..... 5 Hours

Outcome: ***Describe financial planning strategies and use assessment tools.***

1. Explain the purpose of financial planning.
2. Explain the function of budgeting.

C. Financial Planning Assessment Tools ..... 5 Hours

Outcome: Describe and use common financial measurements.

1. Describe and calculate break even point.
2. Explain and calculate payback period.
3. Explain and calculate gross margin return on investment.
4. Describe and calculate the true cost of stolen, lost or damaged product.

D. Financial Planning Measurements ..... 10 Hours

Outcome: Describe and use common financial measurements.

1. Calculate depreciation.
2. Perform a cost/benefit analysis.
3. Calculate return on investment.
4. Explain asset management.
5. Calculate various financial measurements.

E. Quality Management ..... 3 Hours

Outcome: Outline quality management principles.

1. Identify types of quality management strategies.
2. Explain how quality management practices contribute to operations.

SECTION FIVE: ..... HUMAN RELATIONS AND ADVISORY NETWORK ..... 31 HOURS

A. Human Resource Strategies ..... 6 Hours

Outcome: Identify human resource strategies.

1. Describe employee recruitment processes.
2. Describe employee retention strategies.
3. Describe employee development strategies.

B. Human Resource Management ..... 6 Hours

Outcome: Describe human resource management issues.

1. Describe employment termination strategies.
2. Review employment related legislation.
3. Describe human resources related documents, record retention, and related legislation.

C. Workplace Coaching Skills ..... 5 Hours

Outcome: Display coaching skills.

1. Describe coaching skills used for training apprentices.

D. Advisory Network ..... 2 Hours

Outcome: ***Describe the advisory network.***

1. Explain the role and purpose of the advisory network, local apprenticeship committee's, and provincial apprenticeship committee.

E. Interprovincial Standards ..... 12 Hours

Outcome: ***Discuss Red Seal/ Interprovincial standards.***

1. Describe the National Occupational Analysis (NOA).
2. Describe the relationship between the NOA and Red Seal/ Interprovincial examinations.
3. Discuss the roles of federal and provincial government in the development of Red Seal standards.
4. Discuss the role of industry in the development of Red Seal standards.
5. Explain the intent of the Red Seal exam as it relates to interprovincial mobility.
6. Describe sources of information on Red Seal standards and practice examinations.

Excellence through training and experience

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